

CLAIMS

1. A process for an aerobic biological treatment of aqueous organic wastes in an aeration tank in the presence of a biosludge composed essentially of aerobic microorganisms, comprising

a step of aerobic biological treatment realized by subjecting the aqueous organic waste supplied to the aeration tank to an aerobic biological treatment in the presence of a biosludge composed essentially of aerobic microorganisms,

a step of solid/liquid separation realized by subjecting the aerated aqueous suspension in the aeration tank to solid/liquid separation, exhausting the so-separated liquid phase as the treated water and recycling at least a portion of the separated sludge to the aeration tank, and

a step of ozone treatment realized by treating a part of the aqueous suspension in the aeration tank or of the separated sludge with ozone at a pH of 5 or lower and recycling the ozonized suspension or sludge to the step of aerobic biological treatment.

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2. A process according to Claim 1, wherein the ozone treatment step is realized under adjustment of the pH value at 5 or lower by an addition of a pH controlling agent.

3. A process according to Claim 1, wherein the process further comprises, preceding the step of ozone treatment, a step of acidogenesis realized by

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subjecting a part of the aqueous suspension in the aeration tank or of the separated sludge to an anaerobic biological treatment to adjust the pH of the so-treated aqueous suspension or of the sludge at a value of 5 or lower.

4. A process according to Claim 1, wherein the process further comprises, preceding and/or following the step of ozone treatment, a step (or each step) of heat treatment realized by heating the aqueous suspension or the sludge at a temperature between 50 and 100 °C .

5. A process according to Claim 1, wherein the VSS/SS ratio of the biosludge in the aeration tank is maintained at a value of 0.2 - 0.7 and the MLVSS value thereof is maintained at a value of 500 - 10000 mg/l.

6. A process for an aerobic biological treatment of aqueous organic wastes in an aeration tank in the presence of a biosludge composed essentially of aerobic microorganisms, comprising

a step of aerobic biological treatment realized by subjecting the aqueous organic waste supplied to the aeration tank to an aerobic biological treatment in the presence of a biosludge composed essentially of aerobic microorganisms,

a step of membrane separation realized by subjecting the aerated aqueous suspension in the aeration tank to a membrane separation into a permeated liquid and a concentrated sludge, exhausting the so-separated permeated liquid as the treated water and recycling at least a portion of the concentrated sludge

to the aeration tank, and

a step of ozone treatment realized by treating a part of the aqueous suspension in the aeration tank or of the separated concentrated sludge with ozone at a pH of 5 or lower and recycling the ozonized suspension or sludge to the step of aerobic biological treatment.

7. An apparatus for an aerobic biological treatment of aqueous organic wastes, comprising

an aerobic biological treatment unit for subjecting the aqueous organic waste supplied to the aeration tank to an aerobic biological treatment in the presence of a biosludge composed essentially of aerobic microorganisms,

a solid/liquid separation unit for subjecting the aerated aqueous suspension in the aeration tank to solid/liquid separation, exhausting the so-separated liquid phase as the treated water and recycling at least a portion of the separated sludge to the aeration tank, and

an ozone treatment unit (for treating a part of the aqueous suspension in the aeration tank or the separated sludge with ozone at a pH of 5 or lower) and recycling the ozonized suspension or sludge to the aerobic biological treatment unit.

8. An apparatus according to Claim 7, wherein the ozone treatment unit comprises an ozonization vessel for reacting the biosludge with ozone and a means for spraying the reaction mixture extracted from the ozonization vessel onto the liquid surface of the

reaction mixture for suppressing foaming of the reaction mixture.

9. An apparatus according to Claim 7, wherein the ozone treatment unit comprises an ozonization vessel for reacting the biosludge with ozone, a liquid contacting zone for effecting a gas/liquid contact, in which an ozone-containing gas is blown into the biosludge-containing liquid in the ozonization vessel, and a foaming contacting zone for effecting a further gas/liquid contact, in which a foaming layer of at least 1 m thick is built up above said liquid contacting zone.

10. An apparatus for an aerobic biological treatment of aqueous organic wastes, comprising

an aerobic biological treatment unit for subjecting the aqueous organic waste supplied to the aeration tank to an aerobic biological treatment in the presence of a biosludge composed essentially of aerobic microorganisms,

a membrane separation unit for separating the aerated aqueous suspension in the aeration tank using a membrane into a permeated liquid and a concentrated sludge, exhausting the so-separated permeated liquid as the treated water and recycling at least a portion of the concentrated sludge to the aeration tank, and

an ozone treatment unit for treating a part of the aqueous suspension in the aeration tank or the separated sludge with ozone at a pH of 5 or lower and recycling the ozonized suspension or sludge to the aerobic biological treatment unit.

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